

## OCEAN GALES AND STORMS, OCTOBER 1934—Continued

Vessel	Voyage		Position at time of lowest barometer		Gale began October—	Time of lowest barometer October—	Gale ended October—	Lowest barometer	Direction of wind when gale began	Direction and force of wind at time of lowest barometer	Direction of wind when gale ended	Direction and highest force of wind	Shifts of wind near time of lowest barometer
	From—	To—	Latitude	Longitude									
NORTH PACIFIC OCEAN—Con.													
San Bernardino, Am. S. S.	Balboa.....	San Diego.....	13 42 N.	91 30 W.	18	6a, 17.....	18	<i>Inches</i> 29.81	N.....	WNW, 2.....	N.....	N, 8.....	WNW-NW.
Pres. Jackson, Am. S. S.	Victoria, B. C.	Yokohama.....	52 08 N.	156 01 W.	16	8a, 17.....	17	29.52	SSW.....	WSW, 8.....	W.....	WSW, 9.....	SW-WSW-W.
Mana, Am. S. S.	Seattle.....	Honolulu.....	42 40 N.	135 22 W.	20	4p, 20.....	21	29.21	SE.....	NW, 10.....	NW.....	NW, 10.....	SE-NW.
Empress of Japan, Br. S. S.	Vancouver, B. C.	do.....	46 42 N.	128 15 W.	21	6a, 21.....	21	28.93	NE.....	NNE, 8.....	WNW.....	NNW, 10.....	E-NNE-NW.
Steel Inventor, Am. S. S.	Victorias, P. I.	do.....	18 10 N.	143 28 E.	22	Mdt, 22.....	23	29.10	NNE.....	SW, 12.....	SE.....	N, 12.....	N-WNW-S.
Atlantic City, Br. S. S.	Dairen.....	Los Angeles.....	41 38 N.	142 50 E.	24	2a, 25.....	26	29.60	SW.....	WSW, 8.....	WNW.....	WSW, 8.....	SW-WSW-WNW.
Golden Star, Am. S. S.	San Francisco	Yokohama.....	35 21 N.	141 45 E.	24	4a, 25.....	25	29.80	SSE.....	S, 8.....	S.....	S, 8.....	S-SW.
Sanyo Maru, Jap. M. S.	Yokohama.....	Los Angeles.....	41 35 N.	138 53 W.	27	Noon, 27.....	28	29.49	ESE.....	ESE, 8.....	SSE.....	SSE, 9.....	E-SSW.
Taiyo Maru, Jap. M. S.	do.....	do.....	40 20 N.	142 20 W.	27	3p, 27.....	27	29.19	SSW.....	SSW, 7.....	S.....	S, 8.....	SSE-W.
Pres. Garfield, Am. S. S.	San Francisco	Honolulu.....	34 14 N.	132 53 W.	28	Noon, 28.....	28	29.72	SSE.....	SSE, 8.....	W.....	SSE, 8.....	None.
Bellingham, Am. S. S.	Dairen.....	Seattle.....	50 18 N.	141 26 W.	28	4p, 28.....	28	28.82	E.....	SE, 9.....	SE.....	SE, 9.....	None.
Iowa, Am. S. S.	Yokohama.....	San Francisco.....	47 36 N.	157 54 W.	28	2a, 29.....	31	29.38	NW.....	NW, 9.....	WNW.....	NW, 10.....	None.
Atlantic City, Br. S. S.	Dairen.....	Los Angeles.....	42 30 N.	161 15 E.	28	4a, 29.....	30	29.37	SSE.....	S, 10.....	NW.....	S, 10.....	SSE-S-WSW.
San Julian, Am. S. S.	Yokohama.....	do.....	46 00 N.	160 24 W.	30	2a, 30.....	31	29.41	W.....	NW, 7.....	W.....	W, 9.....	NW-W.

## NORTH PACIFIC OCEAN, OCTOBER 1934

By WILLIS E. HURD

**Atmospheric pressure.**—Over all of the northeastern part of the North Pacific Ocean—from Bering Sea to the coast of Washington—pressures were below normal, with the average October barometer at Kodiak (29.33 inches) showing a minus departure of a quarter inch. At or near Kodiak lay the average center for the month of the Aleutian Low, which this early in the season had developed an intensity equal to that characteristic of the height of the winter season.

In middle and low latitudes pressures were about normal or somewhat above, with the extreme plus departure of 0.08 noted at Midway Island. Both the Aleutian Low and the mid-Pacific High, therefore, were abnormally well developed for the season.

TABLE 1.—Averages, departures, and extremes of atmospheric pressure at sea level, North Pacific Ocean, October 1934, at selected stations

Station	Average pressure	Departure from normal	Highest	Date	Lowest	Date
	Inches	Inch	Inches		Inches	
Point Barrow	29.76	-0.17	30.16	22	29.18	17
Dutch Harbor	29.63	-0.02	30.16	26	28.78	30
St. Paul	29.67	-0.06	30.16	26	28.58	3
Kodiak	29.33	-0.26	30.28	14	28.74	31
Juneau	29.76	-0.11	30.35	26	29.01	8
Tatoosh Island	29.97	-0.04	30.40	13	28.85	21
San Francisco	30.02	+0.01	30.30	23	29.66	16
Marathon	29.88	+0.04	29.98	31	29.74	15
Honolulu	30.01	+0.00	30.13	3	29.79	14
Midway Island	30.11	+0.08	30.24	3	29.98	19
Guam	29.88	+0.04	29.98	2	29.74	15
Manila	29.79	-0.01	29.92	28, 29	29.16	15
Hong Kong	29.95	—	30.10	25, 29	29.69	1
Naha	29.98	+0.08	30.12	17, 28, 29	29.82	7, 9, 10
Chichishima	29.94	+0.03	30.20	15	29.58	26
Nemuro	30.13	—	30.52	22	29.80	14

NOTE.—Data based on 1 daily observation only, except those for Juneau, Tatoosh Island, San Francisco, and Honolulu, which are based on 2 observations. Departures are computed from best available normals related to time of observation.

**Cyclones and gales.**—From the beginning to the end of October a succession of cyclonic storms occurred along the upper steamship tracks. These cyclones as a rule were of most pronounced energy during the first third of the month; and the lowest reported barometer was on the 2d, when the American S. S. *Everett* observed a reading of 28.15 inches, with gales up to force 11 on both the 2d and 3d, in the vicinity of 48° N., 163° E. Winds on these dates were also severe (of force 10–11) along other portions of the upper routes between 160° E. and 160° W. Other

winds of force 11 occurred on the 5th and 11th over limited areas north of the 40th parallel, between the meridians already mentioned, as well as gales of less force on other days.

Anticyclones affected northern waters of the Pacific on only 2 or 3 days of the month; and the rise to 30 inches or higher in pressure, when it did occur, was of only a few hours' duration. The prevailing weather, therefore, was for the most part that which might be expected from a succession of disturbances, several below 29 inches in depth, occurring in the midst of a region of generally shallow pressure. This was specifically the case in higher latitudes between the 180th meridian and longitudes 130° to 135° W. In this region gales were reported on at least two-thirds of the days of the month. Pressure fell to well below 28.75 inches on the 6th to 8th and 28th to 30th, about midway between the eastern Aleutians and the coast of Oregon, with attendant gales.

The extratropical cyclone of the month which is outstanding because of its local severity and resulting coastal damage, was that of October 21. This originated on the 20th, near 43° N., 135° W., as a secondary low in the southeastern quadrant of a major storm central in Alaskan waters. During the night of the 20th–21st this depression moved northeastward with fast-gathering intensity, and on the early morning of the 21st was lashing the coasts of Washington and Oregon; the British S. S. *Empress of Japan*, in 46°42' N., 128°15' W., at 5:30 a. m. had a pressure reading of 28.93 inches, followed at 9 a. m. by a north-northwest gale of force 10. During the day the barometer fell to 28.85 inches at Tatoosh Island, and the wind rose to a velocity of 87 miles an hour at North Head, Wash. Huge waves, 20 or more feet in height, rose even in the inland waters of Puget Sound and Lake Washington.

From the marine standpoint, damage was heavy to docks, piers, and small craft, especially in the Washington and northern Oregon areas. Among the marine casualties, may be mentioned the S. S. *Floridian*, which after leaving Portland, was damaged by heavy weather a few miles outside the mouth of the Columbia River, and was forced to return to port for repairs. The S. S. *President Madison*, anchored at Seattle on the 21st, was torn from her moorings in the gale and, crashing into the S. S. *Harvester*, sunk the latter ship, though not before her crew escaped to safety.

In addition to a property loss amounting to more than a million dollars, 22 persons perished, as a result of the

storm, which was one of the severest ever known on that coast.

A note of considerable interest in connection with this storm is the report that Tillamook Rock Light, 133 feet above the ocean, was extinguished for the first time in its history by the seas that swept over its top during the height of the gale.

*Hurricane off the Mexican West Coast.*—One severe tropical cyclone occurred this month west of Mexico. Unlike the hurricane of the preceding September, which traversed a long stretch of coastline, this storm apparently originated at some distance from the coast, and moved northward toward the Gulf of California. The northbound British M. S. *El Mirlo* ran into the moderate west gales of the cyclone at 4 p. m. of the 14th, in  $14^{\circ}$  N.,  $105^{\circ}$  W. With the storm center moving ahead of her, the ship continued in westerly gales for 24 hours, the maximum wind-force being W., 10, at 3 p. m. of the 15th, in  $16^{\circ}04'$  N.,  $106^{\circ}27'$  W. On the morning of the 16th the hurricane center was definitely located near  $19^{\circ}40'$  N.,  $105^{\circ}50'$  W., where the U. S. S. *Dryden*, in a north-northeast hurricane, had a barometer reading of 28.25 inches. Several other ships during the early hours of the 16th encountered hurricane velocities between  $19^{\circ}$ – $20^{\circ}$  N.,  $105^{\circ}$ – $107^{\circ}$  W. The American S. S. *Maine* reported on the unusual suddenness of the onset and ending of the gale. The S. S. *Frank G. Drum*, hove to in the worst of the storm, reported the barometer as pumping violently. All reports indicate that by noon of the 16th gale winds had ceased, as the storm center apparently filled in with extraordinary rapidity.

*Typhoons.*—In the accompanying article, Typhoons in the Far East, by the Rev. Father Doucette, S. J., of the Manila observatory, five typhoons are indicated as having occurred in the Far East during October. Of these, 3 affected the Philippines; and 2, originating east of the Marianas, moved west-northwest to  $20^{\circ}$  N.,  $133^{\circ}$ – $134^{\circ}$  E., then recurved to north and northeast, and passed seaward at some distance east of the Japanese Islands.

It is evident that each of these storms attained great force along some portion of its path. Scattered ship reports show that, in the typhoon of September 29–October 11, the Norwegian M. S. *Skramstad* experienced an east gale of force 11, barometer 29.34, on the 2d, in  $19^{\circ}20'$  N.,  $132^{\circ}30'$  E.

In the typhoon of October 6–12 the Japanese M. S. *Chichibu Maru* reported a north wind of hurricane violence, lowest barometer 28.51, on the 12th, near  $35^{\circ}$  N.,  $144^{\circ}$  E. This is close to the last day's position of the typhoon center, as given in the Manila report, while the storm actually proceeded much farther to the northeastward on the 13th, according to the Tokyo weather maps.

The typhoon of October 21–28—the fifth mentioned in the subjoined Manila report—early became of hurricane violence, as indicated by the report of the American S. S. *Steel Inventor*, which encountered north and southwest winds of force 12, barometer 29.10 inches, in  $18^{\circ}10'$  N.,  $143^{\circ}28'$  E., on the 22d. This storm also seems to have progressed considerably farther north and east than is noted in Fr. Doucette's table, as a storm report of the 29th, giving a south gale of force 10 near  $43^{\circ}$  N.,  $161^{\circ}$  E., appears to be definitely associated with this storm in its final stages.

Finally, there is considerable evidence that a sixth typhoon should be added to the list for the month: On the 7th the Norwegian M. S. *Skramstad* encountered a second violent cyclone after leaving the Philippines en route to San Pedro, the earlier being that of the 2d. The second storm was in  $28^{\circ}$  N.,  $149\frac{1}{2}^{\circ}$  E., wind southwest

12, lowest pressure 28.8 inches. This locality is several hundred miles northeast of the charted position of the only other typhoon of the date east of the Philippines. Unfortunately, there are no further data available to make certain the later history of this storm, although it may be the same cyclone depicted on the Japanese weather map of October 8, central near  $33^{\circ}$  N.,  $145^{\circ}$  E.

*Miscellaneous gales.*—Moderate to fresh northers blew near or in the Gulf of Tehuantepec on the 16th and 18th.

Off the China coast the northeast monsoon was strong on the 3d to 9th, at times attaining fresh gale force in the neighborhood of the Taiwan Channel.

*Fog.*—Fog was less frequent in October, as a rule, than in the preceding month. Along the American coast it occurred on 4 days off Lower California; on 11 days off California; and on 3 days off the coast northward to Vancouver. Scattered fogs occurred in northern waters of the Pacific, being most frequent over the area lying between  $30^{\circ}$ – $45^{\circ}$  N.,  $160^{\circ}$ – $175^{\circ}$  E., where it was reported on 8 days.

*North Pacific aviation.*—The flight of Sir Charles Kingsford-Smith from Australia to California in his plane, *Lady Southern Cross*, occurred partly in October. After his arrival at Suva, Fiji, on the 20th, he was delayed until the 28th in leaving for Honolulu, owing to unfavorable weather. On that date he left Suva and without material difficulty arrived at Honolulu about 24 hours later. On November 3 he left Honolulu, and arrived at Oakland, Calif., 15 hours later (Nov. 4). A few hundred miles from the California coast he encountered fog, but succeeded in locating his position, as he stated it, "by sighting the tops of the hills sticking out of the fog."

This is the first Australia-to-California flight.

#### THUNDERSTORMS AT SEA

The American S. S. *Point Caleta*, G. Hagsberg, master while in  $16^{\circ}20'$  N.,  $99^{\circ}58'$  W., en route northward along the Mexican coast, passed through an electrical storm of "remarkable violence", during the night of October 2–3, 1934, according to a report furnished by the observer, Second Officer James R. Pace. Blinding flashes of lighting repeatedly struck the ship, causing the antenna to fall across the bridge. The fore and main topmasts were shattered, and the main truck was carried away. "Stays carried away the electric charge, and with the exception of when the antenna fell, there was little evidence of St. Elmo's fire."

On the early morning of October 4, in  $18^{\circ}31'$  N.,  $104^{\circ}15'$  W., the S. S. *Point Caleta* passed through another "electrical disturbance of greater brilliancy than the previous night's storm. It began with squalls of wind and rain at 2 a. m. and ended at 3:10 a. m." Lightning this time did not strike the ship, but was striking at varying distances about it.

The barometer was steady on both occasions, and the wind was mostly light and variable.—W. E. H.

#### TYPHOONS IN THE FAR EAST, OCTOBER 1934

BERNARD F. DOUCETTE, S. J.

[Manila Observatory]

Five typhoons affected the weather of the Far East during October 1934. Three of these typhoons formed between Guam and Palau, moved northwest, crossed the Philippines and the China Sea, and entered Indo-China and China. The other two formed east of the northern Ladrone Islands, moved northwest or west-northwest, then recurved to the northeast and moved past Japan.